

William Abney's personality was brought out during his annual summer visits to his beloved mountains. There, among the monarch peaks, glaciers, and snowfields of the Swiss, French, and Italian Alps, he was at his best, a most delightful companion, from whom one learnt something of value almost every moment, and by association with whom one learnt to appreciate the beauty and the "call" of that magnificent world, high up above the vain ambitions and struggles of the world below, in a manner which became one of the highest experiences of one's life. For Sir William was not merely a man of science; he was also both a philosopher and an artist.

He saw and realised the beauty of the natural world as few perceive it, and he had quite a gift of expressing it in water-colours, yet was never satisfied, because he alone understood in so unique a manner how utterly inadequately the pure colours of sky and sea, landscape, and the eternal snows of the Alps can ever be imitated in pigments. And the luncheons on the ice, high up above the Alpine valleys, or the after-dinner talks when the expeditions were over, with the congenial company of distinguished climbers, such as his old friends, Mr. Horace Walker and his sister, Miss Lucy Walker, Mr. Matthews, Mrs. Jackson, Mr. Eccles, Miss Venables, and M Loppé—these are all memories of Sir William in his happiest moments, when, with Lady Abney and Miss Janet Abney, and often other members of his family, the most delightful anecdotes and stories from his immense repertoire used to delight all within earshot.

Sir William was the eldest son of Canon Abney, of Measham Hall, Leicestershire, and was born on July 24, 1843. He was educated at Rossall, and became Lieut. R.E. in 1861, and Capt. in 1873. He was president of the Royal Astronomical Society from 1893 to 1895, and of the Physical Society from 1895 to 1897. He was also chairman of the Royal Society of Arts in 1904. He was created K.C.B. in 1900, and was Hon. D.Sc. and D.C.L. of several universities. He was Principal Assistant Secretary, Board of Education, from 1899 to 1903. Besides his very numerous scientific memoirs to the Royal Society and other learned societies, he is perhaps best known for his published books, the chief of which are: "Instruction in Photography" (1870), "Treatise on Photo-

graphy" (1875), "Colour Vision," "Colour Measurement and Mixture" (1893), "Thebes and its Five Great Temples" (1876), "The Pioneers of the Alps" (with C. D. Cunningham, 1888), and "Trichromatic Theory of Colour" (1914).

The moment, however, is not one for the appraisal of so full a life of scientific work, for the loss of his many-sided delightful personality is too fresh upon us. It is rather of the kindly, genial, and altogether lovable man himself that we think, and deplore the fact that nevermore shall we see his burly form and jovial face, and hear his cheery words, ever full of inspiration to all that was highest and best.

A. E. H. TUTTON.

MR. WILSON HARTNELL, who died on November 10 in his eighty-second year, was well known in connection with his work on steam-engine governors. He was elected a member of the Institution of Mechanical Engineers in 1872, and his paper on automatic expansion gears, read in 1882, has been a mine from which hosts of engineers interested in governors have extracted theorems and data of great practical value.

SIR FREDERICK TAYLOR, Bt., who died on Thursday, December 2, was born in 1847, and received his medical training at Guy's Hospital. He proceeded to the degree of M.D. at London University in 1870, and was university scholar in obstetric and forensic medicine; later he represented the university on the General Medical Council. Sir Frederick was appointed consulting physician to Guy's Hospital, and remained in close touch with that institution throughout his life; he was also physician to the Seamen's Hospital, Greenwich. In 1907 he delivered the Harveian Oration. His career reached its culminating point when he was elected president of the Royal College of Physicians, and had illness not intervened he would probably have been re-elected for a second term of office. Sir Frederick was the author of numerous contributions to medical societies and journals, although he is probably best known for his "Practice of Medicine," a standard work which has reached its eleventh edition.

Notes.

It has been generally understood that the Water Power Resources Committee of the Board of Trade has for some time been considering the possibility of tidal-power development, with special reference to the Severn estuary. In view of this it would be of interest to know to what extent the scheme formulated by the Ministry of Transport has been influenced by the conclusions of that Committee. As outlined and illustrated in the *Times* of November 26, the scheme would appear to be open to certain weighty objections, and, in view of the large number of technical problems, alike in mechanical, electrical, and hydraulic engineer-

ing, which require to be co-ordinated and solved before any such scheme can be embarked upon with any certainty of ultimate success, there would not appear to be any likelihood of its materialising immediately. At the same time the prospects of the scheme, should it prove commercially and mechanically feasible, are so great that every endeavour should be made to have the matter investigated in the fullest detail by a strong technical and scientific Commission. As pointed out in *NATURE* of June 3 last, much still requires to be known on such questions as those regarding the effect of the proposed barrage on the

silting of the estuary and on the general régime of the river, the best size and form of turbine and generator, the use of alternating- or direct-current generators and of geared or ungeared turbines, the maximum economic capacity of the installation, and the volume of water actually available in the case of such an estuary as that of the Severn under operating conditions. All these are problems to which existing data are inadequate to enable a complete answer to be supplied, but to which such experience as is available, augmented by some special experimental investigations, should be adequate to give a definite answer. Tempting as the scheme may appear, it would be wise to suspend judgment as to its possibilities until the report of some such Commission as is suggested is available.

IN continuation of the article in NATURE of April 1 last, p. 153, on the Tropical Agricultural College in the West Indies, it may be noted that a circular letter dated January 27, 1920, was sent out by the Colonial Office to Governors of West Indian Colonies directing their attention to the report of the Committee upon the proposed agricultural college, and to the advantages that would be likely to accrue to the Colonies from its establishment. It was pointed out that the West Indies had now the chance of creating an epoch in their economic history, especially as they are at present so prosperous that they might well hope to equal or surpass any similar institution on foreign soil. Much hard work and skilled direction will, however, be necessary if Buitenzorg is to be surpassed. The letter ends by demurring to the proposal that the Imperial Government should contribute half the cost, pointing out that the Colonies do not contribute to the cost of institutions in this country that are of value to them. Later telegrams announce that the vexed question of the site has been settled in favour of Trinidad, which Colony has now a great opportunity before it. The site has been selected on the Government farm at St. Augustine, about six miles from Port of Spain. The Governments of Trinidad, Barbados, Grenada, St. Lucia, St. Vincent, the Leeward Islands, as well as Bermuda, have offered financial support.

A CONSIDERABLE impetus should be given to electrical research by the incorporation under the Department of Scientific and Industrial Research of the British Electrical and Allied Industries Research Association, which is the outcome of the joint activities of the Institution of Electrical Engineers and the British Electrical and Allied Manufacturers' Association. Half of a guaranteed minimum income of 16,000*l.* per annum is to be contributed by the Department of Scientific and Industrial Research, which has also undertaken to contribute pound for pound against further manufacturers' subscriptions up to twice that figure. The association is in close touch with the British Engineering Standards Association and the National Physical Laboratory, and the council, which is under the chairmanship of Mr. C. H. Wordingham, includes seven representatives each of the Institution of Electrical Engineers and of the British Electrical and Allied Manufacturers' Association, with Prof. W. H.

Eccles and Sir J. E. Petavel as representing the Department of Scientific and Industrial Research. The character of the work already undertaken gives some indication of the wide field which may be covered. This includes a comprehensive investigation into composite and fibrous insulating materials, porcelain, and mica, and inquiries into particular classes of apparatus such as mining switchgear. The present programme also includes investigations on sludging in insulating oils, the preparation of data for standard specifications for these and other insulating materials, and a research on the heating of buried cables. Arrangements are in hand for rapidly extending the programme of research, and all communications regarding the association should be addressed to Mr. E. B. Wedmore, secretary and director of research, at 19 Tothill Street, Westminster, S.W.1.

THE British Music Industries Research Association has been approved by the Department of Scientific and Industrial Research as complying with the conditions laid down in the Government scheme for the encouragement of industrial research. The association may be approached through Dr. R. S. Clay, Northern Polytechnic Institute, Holloway, London, N.7.

THE next meeting of the Chemical Society will be held on Thursday, December 16, at 8 p.m., in the lecture hall of the Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W.1, when Sir Robert Robertson will deliver a lecture entitled "Some Properties of Explosives."

SIR J. F. C. SNELL, member of council of the Institution of Civil Engineers and past-president of the Institution of Electrical Engineers, has been appointed by an Order of Council to be a member of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research.

PROF. J. PERRIN (Paris) and Prof. C. Fabry (Marseilles) have been elected honorary members of the Royal Institution, and Prof. Arthur Keith has been re-elected Fullerian professor of physiology for a further term of three years. The Christmas course of juvenile lectures this year will be delivered by Prof. J. Arthur Thomson on "The Haunts of Life," commencing on Thursday, December 30, with The School of the Open Shore as the subject, and followed by The Open Sea, The Great Deep, The Fresh-waters, The Conquest of the Land, and The Mastery of the Air.

ON December 1 the Natural History Museum Staff Association held, by permission of the Trustees, the last of its scientific reunions for the current year. Many interesting exhibits of new acquisitions to the museum collections and other specimens of exceptional interest were shown in the board room, and in a darkened room close by Dr. E. A. Cockayne gave a demonstration of the remarkable fluorescent properties of certain moths and butterflies in ultra-violet light, the specimens used being drawn from the museum collection. Among the visitors present were Lord Rothschild, Lord Sudeley, Lt.-Col. A. W. Alcock, Prof. E. B. Poulton, Prof. J. H. Ashworth,

Prof. A. W. Hill, Prof. A. Dendy, Prof. J. P. Hill, Prof. E. W. MacBride, Dr. J. W. Evans, Dr. W. D. Matthew (of the American Museum of Natural History), and M. F. Le Cerf (of the Muséum de l'Histoire Naturelle, Paris).

THE weather for the autumn season in the several districts of the United Kingdom is shown in the Weekly Weather Report of the Meteorological Office for the week ending November 27. The period comprises the thirteen weeks from August 29 to November 27. Temperature attained its highest reading, 76° F., in the south-east of England, and the lowest shade temperature in England was 18° F. in the south-west. The mean temperature for the period was above the normal except in the eastern districts of England and in the Midland Counties; the greatest excess was 2° in Ireland. For the whole of the British Isles the mean was 51.1°. Rainy days were fewer than the average except in the south of Ireland. The amount of rain varied from 11.34 in. for the north of Scotland to 3.77 in. for the north-east of England. The fall was less than the average except in Ireland; the greatest deficiency was 4.17 in. for the north-west of England. Bright sunshine was deficient except in England east and north-west. At Greenwich the mean temperature for the autumn was 51.2°, which is 0.5° above the mean. The mean of the day or maximum readings was 1.5° in excess of the normal; the mean of the lowest or night readings was 0.7° in defect. September had a normal temperature, October an excess of 2°, and November a deficiency of 0.5°. The rainfall for the autumn was 1.23 in. deficient. September had an excess of 1.70 in., October a deficiency of 1.54 in., and November a deficiency of 1.39 in. Remarkable as the October deficiency of rain is in 1920, the amount measured in 1919 was even less at Greenwich.

JOHNSON CAÑON, probably the largest of the eastern tributaries of the Mancos Cañon, lies on the divide between La Plata and Montezuma Counties in Colorado. Here some important ruins are described by Mr. E. H. Morris in the thirty-third annual Report of the American Bureau of Ethnology. Large collections of interesting pottery, consisting of coil-ware ollas and some beautifully ornamented black-and-white and black-and-red bowls, have been discovered. The culture, as a whole, was a rather restricted characteristic of the Mesa Verde region, the materials for weaving, building, and pottery being procured in the immediate neighbourhood, while the fruits of wild trees and plants, as well as the cultivated crops, came, with few exceptions, from the neighbouring cañons and mesas.

THE Bulletin of the New York Zoological Society (vol. xxiii., No. 4) is devoted to a survey of the history of the white rhinoceros of the Belgian Congo. The habits and external characters of this vanishing species are tersely reviewed and comparisons made with its near ally, the black rhinoceros. The traffic in the horns of this animal, it is contended, must be completely restricted if it is to be saved from speedy extinction. A number of remarkably fine illustrations add much to the value of this publication.

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THE Field Naturalists' Club of Victoria was founded in May forty years ago. In 1906 Mr. F. G. A. Barnard published in its organ, the *Victorian Naturalist*, a history of its first quarter of a century. In the October issue of that magazine he gives a retrospect of the last fifteen years. This vigorous society does excellent work in promoting a love of Nature and the study of natural history in the neighbourhood of Melbourne. That it succeeds in arousing the interest of the general public is shown by the fact that five exhibitions of wild flowers held during the war period for special objects brought in more than 6221.

AMONG the more important papers published in the thirty-third annual Report of the American Bureau of Ethnology is that by Mr. M. R. Gilmore on "The Uses of Plants by the Indians of the Missouri River Region." The writer remarks: "We shall make the best and most economical use of all our land when our population shall have become adjusted in habit to the natural conditions. The country cannot be wholly made over and adjusted to a people of foreign habits and tastes. There are large tracts of land in America whose bounty is wasted because the plants which grow on them are not acceptable to our people. This is not because these plants are not in themselves useful and desirable, but because their qualities are unknown. So long as the people of the country do not demand articles of food other than those to which our European ancestors were accustomed, these articles will be subject to demand in excess of production, with consequent enhancement of cost, while at the same time we have large land areas practically unproductive, because the plants they are best fitted to produce are not utilised."

THE report of the council presented to the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne at the end of October records an increase of membership and a resumption of activity after the war. The museum building, of which a large part had been occupied by Armstrong College, has been overhauled, lectures and talks have been well attended, an entomological section has been established, and field excursions have been organised. Though there is nothing of particular interest to report, it is pleasing to note that the exceedingly valuable collections of the Hancock Museum have received skilled curatorial attention.

THE United States Department of Agriculture has just issued Bulletin No. 794 on the waterfowl and their food-plants in the sandhill region of Nebraska, which is valuable and instructive because the resorts of these economically important birds are becoming more and more restricted owing to the draining of lakes and marshes. Hence, before it is too late, the Department has decided to take steps to conserve the remaining supply of waterfowl inhabiting these areas. This inquiry, it urges, is very necessary "if we are to take intelligently directed steps towards passing on what remains of our heritage of natural wealth." In this far-seeing policy the United

States sets an example which might well be followed by our own Ministry of Agriculture, which has frequently been urged to establish a Bureau of Ornithology for similar functions.

THE results of the inquiries made by the Special Committee on Food-grains with regard to the Indian rice industry are embodied in a report on the trade in Indian rice, to which are appended two further reports on the production and uses of rice and on the utilisation of Burmese rice and its by-products respectively ("Indian Trade Enquiry: Reports on Rice," published by John Murray). In the main report reference is made to the two branches of the world's rice trade, viz. the Far Eastern branch, requiring a cheap rice for feeding the native population, and the Western branch, requiring large quantities of a medium quality rice and smaller quantities of a high quality product. The sources of supply of these markets are referred to, and sections are devoted to the following subjects: The world's trade in rice; the rice trade of India with the British Empire and with the Continent; imports, exports, and home consumption of rice in European countries and the United States; and the comparative cost of handling, milling, and transporting rice in the United Kingdom and on the Continent. The industrial uses of rice are also dealt with, and a series of statistical tables forms an appendix to the report. In 1913 India (chiefly Burma), Siam, and Indo-China together contributed 94 per cent. of the world's exported surplus of rice (including paddy, *i.e.* unhusked rice), the amount of the Indian exports roughly equalling those from Indo-China and Siam combined. The total Indian export (2,450,000 tons) is approximately equivalent to the total requirements of the British Empire from the three chief exporting countries.

THE Cardiff Naturalists' Society has instituted a faunistic survey of Glamorgan, and as a preliminary has issued a useful pamphlet of instructions to collectors. Regional and faunistic surveys form part of the activities of many societies in Great Britain, but the work is hampered, as a rule, by the lack of concise instructions for collecting. This is a difficulty which the Cardiff Naturalists' Society has wisely foreseen and endeavoured to overcome. The pamphlet is concerned only with the terrestrial and fresh-water fauna, and each group of animals is dealt with separately and in detail. The collector is furnished with valuable hints on the habitats in which to search for special animals, and with instructions for their capture, preservation, and packing. We are glad to note the stress which is laid on the necessity for adequate data to accompany each specimen. It is a point which cannot be too often or too strongly insisted upon. The attention of workers is further directed to the advisability of collecting both the external and internal parasites of the vertebrate groups and of an examination of the stomach contents. Due regard is paid to the value of field observation in a survey such as this society contemplates, and useful advice on special points requiring further elucidation is given under each group of animals. The section devoted to

insects is particularly good and full, and the collector will be specially grateful for the many hints on the manipulation of the more delicate and smaller forms. His work will be made easier for him, and the results will be more gratifying to the referees and to those who will ultimately have charge of the specimens. Altogether this is an admirable pamphlet which should be of the greatest service to those who are undertaking the field-work in connection with the survey, and should go far to ensure the success of the scheme. Other organisations contemplating similar work will find it invaluable. We understand that copies of the pamphlet may be obtained from the secretary of the Cardiff Naturalists' Society, Dr. J. J. Simpson, 35 Park Place, Cardiff, at a nominal charge of 6d. each, or in larger quantities at special rates if desired.

THE latest part of the Annals of the Transvaal Museum (vol. vii., part 2, 1920) contains two valuable papers by Dr. E. C. N. van Hoepen on remains of carnivorous dinosaurs from the Karroo formation of South Africa. The fossils are described in great detail, with adequate illustrations, and include all important parts of the skeleton except the skull. They seem to represent some genera allied to the European Triassic Plateosaurus, others to the North American Triassic Anchisaurus. One femur is exceptional in not being hollow. The author is to be congratulated on his painstaking work, which makes possible a more exact comparison of the South African Triassic carnivorous dinosaurs with those from other parts of the world.

DISEASES of bees known as foulbrood are dealt with by Mr. G. F. White, of the United States Department of Agriculture. In Bulletin No. 810 European foulbrood is discussed. It is an infectious disease of the brood of bees, characterised by death of the brood during its uncapped stage and by absence of odour. The stock may be weakened, or even exterminated, by the disease. In 1885 Cheshire and Cheyne ascribed the disease to a sporing bacillus, *B. alvei*. According to Mr. White, however, this organism is only a secondary invader of the dead larvæ, and not the cause. The causative organism is *B. pluton*, an ovoid and sometimes yeast-like form, which cannot be cultivated, and gains entrance to the larvæ by the mouth. American foulbrood (Bulletin No. 809) is characterised by a decided ropiness of the decaying brood and a peculiar foul odour. It is of almost world-wide distribution, and occurs in this country. The causative organism is a sporing bacillus, *B. larvae*, which can be cultivated on an agar made from bee larvæ and on an unheated egg-yolk agar. Full details respecting these diseases are given in these two bulletins.

THE latest volume (vol. xvi.) of the Special Reports on the Mineral Resources of Great Britain, issued by the Geological Survey, contains an account of the petrography and chemistry of the refractory materials, ganister, silica-rock, sand and dolomite, by Messrs. H. H. Thomas, A. F. Hallimond, and E. G. Radley. It may be looked upon as a continuation of vol. vi.

of the same series, which dealt with the geology and mode of occurrence of these materials, and thus completes the information on these important substances already published. The chemistry of the raw materials and the chemical changes which they undergo in order to fit them for use in the furnace are discussed in some detail, and a number of complete analyses, most of which have been made in the Survey laboratory, are included. Much attention has also been devoted to the microscopic examination of the materials in their native state, as prepared for use in the furnace and after such use. The volume is, therefore, likely to be found extremely valuable to all users of refractory materials, more particularly to steel-makers, whose requirements have evidently received special attention.

THE process of cold vulcanisation of rubber invented by Mr. S. J. Peachey, to which reference was made in *NATURE* of July 15, p. 625, consists in treating the rubber alternately with sulphur dioxide and hydrogen sulphide. The gases are separately absorbed by the rubber, and by interaction produce a highly active form of sulphur which brings about vulcanisation. The process obviates the use of sulphur chloride, and, since it takes place in the cold, renders possible the use of organic filling and colouring agents which are not affected by the two gases, but would be decomposed in the ordinary process.

AN excellent feature of a new catalogue received from Mr. Cuthbert Andrews (47 Red Lion Street, W.C.1) is a series of six coloured plates illustrating X-ray tubes in action. These illustrations, besides being extremely good technical productions, should be very instructive to those who desire to familiarise themselves with the various appearances of X-ray tubes. There is, of course, still a wide field of utility in the gas-tube, and the various devices designed to overcome some of their vagaries are dealt with in detail in this catalogue. Protective measures in X-ray work are not lost sight of; the appliances manufactured by Mr. Andrews are given the rather happy name of "Protex."

THE difficulty experienced by workers in damp climates in maintaining the insulation of electrostatic measuring instruments has, according to the July issue of the *Journal of the Asiatic Society of Bengal*, led Prof. Jackson and Mr. A. T. Mukerjee to enclose their Dolezalek electrometers in hermetically sealed cases and to test the efficiencies of the desiccators in common use. They find that for reducing the rate of leak from such an electrometer calcium chloride, sodium, quicklime, and phosphorus pentoxide are valueless, owing possibly to the chemical action between them and the moisture they take up producing ions which render the air conducting. Sulphuric acid boiled with a small quantity of ammonium sulphate, as recommended for Kelvin electrometers, and having a density of 1.84, corresponding to 95 per cent. of pure acid, is the only desiccant they have found to be entirely suitable. If occasionally stirred it retains its efficiency for several weeks.

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THE October issue of the *Journal of the Franklin Institute* contains the address on optical glass given by Dr. A. L. Day, the director of the geophysical laboratory of the Carnegie Institution, and during the war in charge of optical glass production, to the physics and chemistry section of the institute in March last. In the course of the address Dr. Day described the steps taken by the United States Government to help the manufacturers to overcome the difficulties of the manufacture of optical glass in sufficient quantities to meet the demand produced by the war. It was found that the manufacture was not beset with mysteries as it had been represented to be, but that it was a straightforward scientific problem solvable by the methods commonly used in attacking problems of high precision. The results of the experience are all published, and are available for those who wish to make the manufacture of optical glass a permanent industry of the country. It is, however, recognised that the demand will be small, and that the industry may have to be subsidised by the Government, or, if not, to depend on other lines for its profits.

MESSRS. PASTORELLI AND RAPKIN, LTD., of 46 Hatton Garden, London, E.C.1, have forwarded to us their list of self-recording meteorological instruments. The various forms of barographs afford ample choice to satisfy the different uses for which these instruments are required. The "dial barograph," which gives the face of the ordinary aneroid as well as the charted record, adds much to the interest of the reading of atmospheric pressure. With the new units of measurement which are now becoming of such general use it seems desirable that the scale should be given in millibars as well as in inches. Barothermographs showing the records of pressure and temperature on the same drum will be welcomed by many. The Edney hygrograph seems an improvement on the ordinary arrangement for securing an accurate temperature and for reducing the sluggishness introduced into some other forms of thermographs. Prices are necessarily high in comparison with pre-war rates, but the advance is not excessive. The firm has a long record, since 1750, which is essentially an advantage to a maker of all kinds of scientific instruments, as many improvements are the more easily recognised.

THE presidential address of Mr. L. B. Atkinson to the Institution of Electrical Engineers, delivered on November 18, marked the commencement of the jubilee year of the institution, which was founded in 1871 as the Society of Telegraph Engineers, although a previous society, called the Electrical Society of London, had existed from 1837 to 1845. In reviewing the progress achieved during the last half-century the president traced the changes in our conceptions of electrical and other physical phenomena from Maxwell's original ideas to the modern electron theory and the newer outlook revealed by the researches of Einstein and others. The development of methods of generation of electrical currents by mechanical means was followed from the discovery of the self-exciting dynamo in 1867 to the large turbo-alternators of

to-day. Mr. Atkinson looked forward to further progress in the gas turbine, and hinted that some process of current production avoiding the limits imposed by the second law of thermodynamics might be found, and that perhaps an electrical method of unlocking the stores of energy in the atom might ultimately be discovered. After a few words on the history of electric supply, transmission of power, and cable manufacture, Mr. Atkinson passed on to a review of telegraph and telephone progress. Both submarine and land line telegraphy had reached a high degree of advancement when the institution was founded, but the telephone did not exist, and such ideas as there were on the possibility of communication without wires were in the direction of earth conduction. Recent developments included applications of the

wonderful thermionic amplifier to cable telegraphy as well as to line telegraphy and wireless. Among matters requiring further research were the development of more exact methods of estimating the quality of transmitted speech and multiplex and superposed telephony.

MESSRS. W. HEFFER AND SONS, LTD., Cambridge, have just issued a catalogue (No. 194) of publishers' remainders which should be seen by those on the lookout for standard books in a new condition as Christmas or New Year presents. Many of the volumes offered for sale deal with scientific subjects, but most are of general interest. All are listed at prices far below those at which they were published. The catalogue is obtainable upon application.

Our Astronomical Column.

THE DECEMBER METEORS.—These meteors are due to reappear on the nights of December 10-13, and with suitable weather ought to be well observed this year, as there will be no interference from moonlight. The maximum will probably occur on December 12, when the radiant will be at $112^{\circ}+33^{\circ}$ near α Geminorum. The point of radiation apparently moves eastward at the rate of 1° daily. The meteors are moderately swift, sometimes slow, but their individual aspects depend in a measure upon their relative positions with respect to the observer and the radiant. In the early hours of the evening the flights are longer than in the later part of the night, the radiant being higher in the sky in the small hours of the morning.

MINOR PLANETS.—Ceres will be in opposition on Christmas Day in high north declination, its magnitude being 7.2. The following approximate ephemeris for Greenwich midnight is from Marseilles Circular No. 412:

	R.A.		N. Decl.		R.A.		N. Decl.
	h.	m.			h.	m.	
Dec. 3	6	37 48	25 27	Dec. 18	6	24 30	26 41
8	6	33 54	25 52	23	6	19 24	27 5
13	6	29 24	26 17	28	6	14 6	27 27

Log r , log Δ December 3, 0.424, 0.240; December 23, 0.421, 0.219.

The planet is close to ϵ Geminorum at the beginning of December.

Astr. Nach. Circular No. 46 reports the discovery of a very interesting planet which has been provisionally named HZ. It was found photographically by Dr. W. Baade at Bergedorf on October 31, and observed again on November 2 and 12, its magnitude being about 13. Dr. G. Stracke has computed the following elements:

Epoch 1920 October 31.5 G.M.T.			
M = $348^{\circ} 33' 35.4''$	$\mu = 320.085''$		
$\omega = 57^{\circ} 38' 40.2''$	log $a = 0.696494$		
$\Omega = 21^{\circ} 22' 26.8''$	log $q = 0.2887$		
$i = 41^{\circ} 28' 58.6''$	T = 1921 March 9.2		
$\phi = 37^{\circ} 31' 0.8''$	Equinox 1920.0		

It will be observed that the value of the mean motion would make it a member of the Trojan group, but the very large inclination and eccentricity (which are cometary rather than planetary) would prevent any close adherence to the equilateral configuration with

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the sun and Jupiter, which is the characteristic of that group.

Ephemeris for Greenwich Midnight.

			R.A.		N. Decl.
			h.	m.	
December 6	...	0	8	16	18 27
10	...	0	7	24	19 18

The perihelion and aphelion distances are 1.944 and 7.998 respectively.

PHOTOGRAPHIC PARALLAX DETERMINATIONS AT ALLEGHENY.—Vols. iv. and v. of the Publications of this observatory, of which Prof. F. Schlesinger is director, contain parallaxes of nearly three hundred stars, the average probable error being given as 0.008". A few of the larger parallaxes are recorded below, with notes on previous determinations. An asterisk denotes a spectroscopic parallax:

Star	Parallax	Some previous determinations	
τ Cygni ...	0.058	0.125, 0.029, 0.006, 0.023	
ϵ Pegasi ...	0.067	0.063, 0.120	
μ " ...	0.043		
β Virginis ...	0.096	0.110, 0.100*, 0.096	
42 Coronæ ...	0.064	0.119, 0.058	
ζ Herculis ...	0.114	0.172, 0.101, 0.146, 0.086, 0.066*	
μ " ...	0.104	0.122, 0.126, 0.093, 0.051, 0.096*	
85 Pegasi ...	0.084	0.054, 0.096, 0.084, 0.101, 0.096*	
ϕ 547 (mean)	0.103	0.134, 0.095, 0.120*	
(Furujelm star) ¹	0.099	0.112	
χ Orionis ...	0.096		
8 Canum Ven.	0.109	0.089, 0.084, 0.105*	
ξ Boötis ...	0.147	0.225, 0.151*	
η Cassiopeiæ...	0.173	0.188, 0.182, 0.178*, 0.180	
61 Cygni (mean)	0.285	0.270, 0.272, 0.322, 0.301	
Castor (mean)	0.070	0.053	

¹ This star has the same P.M. as ϕ 547, being 53' distant.

The great advance in the accuracy of photographic parallaxes in recent years is very satisfactory. It may be ascribed to the many additional precautions now taken, notably the equalisation of magnitudes by rotating sector or otherwise, and confining the photographs to the neighbourhood of the meridian to minimise the effect of atmospheric dispersion.

Vol. vi., No. 2, of the Allegheny Publications contains a paper by Mr. C. J. Hudson on the amount of error arising from this dispersion. The effect on pairs of plates taken at considerable hour-angles east and west is 0.021". It should be quite negligible on the parallax plates.